

REMARKS/ARGUMENTS

Reconsideration of the application is requested.

Claims 13-22 remain in the application. Claims 1-12 have previously been cancelled. Claim 19 is amended herewith.

The specification has been amended by deleting the reference to claim 1 on page 2, line 20. Should the Examiner find any additional objectionable items, counsel would appreciate a telephone call during which the matter may be resolved.

We now turn to the art rejection, in which claims 13-15 and 22 have been rejected as being obvious over Schuh et al. (US 6,528,927 B1, "Schuh") in view of Heinz et al. (US 6,765,337 B1, "Heinz") under 35 U.S.C. § 103. We respectfully traverse.

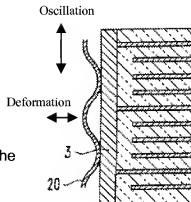
We acknowledge the Examiner's reading of the primary reference Schuh on the claims of this application. The metallization strips, as understood, should be identified "20, 21" as opposed to "22." Office action, page 2, fourth line from the bottom. The elements 22 in Schuh's assembly appear to be electrical terminals, which would correspond to applicants' "first and second connection elements" illustrated in Fig. 1 and identified "8" and "9."

We respectfully disagree with the Examiner's statement that the electrodes 16 of Schuh compensate for length variations of the piezo actuator "by an elastic deformation thereof substantially exclusively in a plane parallel to the main oscillation direction." The main oscillation direction of Schuh is indicated by the arrow 19. As

illustrated in Figs. 2A – 2C, for example, the webs 162 extend perpendicular to the direction 19. See, col. 6, lines 4-6. The metallization strips 20, 21 to which the webs 162 connect extend in the direction 19. The metallization strips, however, are not elastically deformable in the direction 19.

We do agree with the Examiner that Schuh “fails to disclose the external electrodes having a meander-form.” Office action, page 3, line 4.

The Examiner then utilizes the secondary reference Heinz to show that the prior art knew of meander-form electrodes that are capable of compensating for expansion and contraction in the oscillation direction. Heinz does indeed describe a piezo-electric actuator in which a meandering electrode (20) is utilized to bridge potential cracks that may form in the outer electrode 3. The undulated electrode 20 is indeed



capable of compensating for an expansion/contraction of the stack in the oscillation direction (vertical). The compensation, however, is effected by a deformation that is perpendicular to the oscillation direction. Heinz does not disclose an outer electrode that compensates structurally by an “elastic deformation thereof substantially exclusively in a plane parallel to the main oscillation direction,” as required by applicants’ claim 13.

The concept underlying applicants’ invention has to do with a two-part objective, namely, (1) to assure proper and continuous contacting of the device with the outer electrodes and (2) to require as little space with the device as possible. The art

knows of several solutions to the first object. The reference to Heinz, for example, appears to disclose a satisfactory solution. The second object, however, is only satisfied by the claimed invention.

As explained on page 2 of the specification, modern engine components are allowed "less and less room" because of increasingly confined space in the engine compartment. The requested solution to the problem, then, is to not expand and contract in a direction that would require additional space. This is why applicants' outer electrodes are configured to compensate by elastically deforming "substantially exclusively" in a plane parallel to the oscillation direction.

Heinz, of course, deforms the electrodes largely by bulging outwardly (i.e., perpendicular to the oscillation direction). The second object is not satisfied by Heinz.

Claim 13 is patentable over the combination of Schuh and Heinz.

Even if, *arguendo*, the Examiner's statement concerning the primary reference Schuh (i.e., that it shows the elastic deformation substantially exclusively in a plane parallel to the oscillation direction) were true, the combination would still not render the invention of claim 13 obvious. The requirement that the deformation be effected in a plane parallel to the oscillation is an essential feature of applicants' invention. If the undulating electrode of Heinz were utilized in the assembly of Schuh, the space-related object as noted above would not be achieved. This is so because the electrode of Heinz deforms perpendicularly to the oscillation direction and the space

required by the actuator includes the space dedicated to the expansion in the oscillation direction and the lateral expansion when the undulating electrode is compressed.

We are, of course, mindful of the fact that this argument is primarily a "structural" argument where the structure of the secondary reference is incorporated into the structure of the primary reference. The argument relating to the teachings, or the combination of the teachings, is equivalent. That is, both references lack the teaching that is pursued by the claimed invention and, further, the "solution" provided by the secondary reference would indeed destroy the functionality of the device in terms of the essential requirements of applicants' claims.

The indicated allowance of claims 16 and 17-21 is appreciatively noted. In light of the above argument, however, these claims have not been rewritten in independent form. None of the references, whether taken alone or in any combination, either show or suggest the features of claim 13. Claim 13 is, therefore, patentable over the art and since all of the dependent claims are ultimately dependent on claim 13, they are patentable as well. The allowance of claims 13-22 is solicited.

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